



Research Paper

Structure and conduct of paddy seeds market - A study in Mandya district of Karnataka state

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Paper History :

Received : 24.07.2016;

Revised : 12.08.2016;

Accepted : 29.08.2016

ABSTRACT : The present study was conducted in Mandya district, which is one of the major paddy producing belts of Karnataka state. The study analysed the structure and conduct of paddy seeds market in Mandya district. For the study, data was collected both from primary and secondary sources. Multi-stage random sampling method was adopted to draw 25 farmers each from two talukas of the district, resulting in a total sample size of 50 farmers. The paddy seeds market was found to be oligopolistic in nature. Among the various seed agencies / companies prevalent in the study area, Karnataka State Seeds Corporation Limited (KSSC) was the dominant player with an average market share of about 78 per cent for the reference period (2006-07 to 2013-14) followed by National Seeds Corporation (NSC) with around 10 per cent. The Theil's Entropy Index was found to be 0.09, indicating that the paddy seeds market was highly concentrated. The overall growth rate of sales of paddy seeds by all the seed agencies (Government as well as private) operating in Mandya district was found to be negative (-0.95 %), indicating that the paddy seeds market was saturated. For majority (74 %) of the farmers, good quality of seeds was the most important factor which influenced their loyalty towards a particular brand.

KEY WORDS : Market structure, Market conduct, Paddy seeds

HOW TO CITE THIS PAPER : Deepana, H.D. and Girish, M.R. (2016). Structure and conduct of paddy seeds market - A study in Mandya district of Karnataka state. *Internat. Res. J. Agric. Eco. & Stat.*, 7 (2) : 251-256, DOI : 10.15740/HAS/IRJAES/7.2/251-256.

INTRODUCTION :

Paddy (*Oryza sativa* L.) is the most important and extensively grown food crop in the world. It is the staple food of more than 60 per cent of the world's population. Rice is mainly produced and consumed in the Asian region. It is the staple food of most of the people in South-East Asia. India has the largest area under paddy in the world and ranks second in production after China.

Paddy is a self-pollinated crop. It is grown in almost all the states of India but is mostly concentrated in the river valleys, deltas and low-lying coastal areas of north-

eastern and southern India. Rice is the most preferred staple food for about 65 per cent of the population. It continues to play a vital role in the country's agricultural exports.

Seed is a fertilized mature ovule with an embryonic plant, stored food material and protective seed coat. Seed is the basic and most important input in agriculture, which holds the key to farm productivity and profitability. Without good seed, the investment on water, fertilizer, pesticides and other inputs do not provide desired dividends. Good agriculture depends upon good seed and vice-versa. Infact, seed is the real vehicle of production and other inputs can be regarded as fuel. Quality seed largely

determines the success of modern farming as other management and cultural practices come into play only after the germination of seeds and establishment of seedlings. The pace of progress in food production will largely depend upon the progress of seed programme through multiplication and marketing of good quality seeds of high yielding varieties with superior genetic constitution. It is therefore essential to make quality seeds available to the farmers at the right place, on right time at cheaper rate.

The Indian seed industry comprising of both public and private sector companies is well poised to meet the specific seed demands of farmers, dealers and distributors. Currently, 25-30 per cent of the total seed requirement of the country is being met from organized seed production while the rest of the seed requirement is met from farm saved seed. Farmers are to be motivated to use quality seed obtained from organized seed production rather than using own seed.

Market structure and market conduct :

Market structure refers to a set of market characteristics that determine the economic environment in which a firm operates (Thomas and Maurice, 2011). It is characterized on the basis of four industry characteristics, viz., (i) number and size distribution of active buyers and sellers and potential entrants; (ii) degree of product differentiation; (iii) amount and cost of information about product price and quality; and (iv) conditions for entry and exit (Hirschey and Pappas, 1993).

Market conduct refers to the patterns of behaviours, that firms follow in adapting or adjusting to the markets in which they sell or buy. The dimensions of conduct include methods employed by firms in determining the price of an output and sales promotion policy, the presence or absence of coercive tactics directed against either established rivals or potential entrants (Bain, 1968).

The present study analysed the structure and conduct of paddy seeds market in Mandya district of Karnataka state.

MATERIALS AND METHODS :

For the study, data was collected both from primary and secondary sources. The primary data required for the study was obtained from farmers and dealers using pre-tested schedule through personal interview method.

The necessary secondary information regarding agency-wise market share of paddy seeds market was collected Karnataka State Seeds Corporation Limited and Department of Agriculture, Mandya

A multi-stage random sampling method was adopted as an appropriate sampling procedure for the study. Mandya district was purposively selected for the study as it is one of the major paddy growing belts in Karnataka. In the second stage, Maddur and Srirangapatna talukas were purposively selected. In the third stage, two villages in each taluka; Yadavanahalli and Thaggahalli from Maddur taluka; and Madarahalli and Peehalli from Srirangapatna taluka were selected based on the area coverage under paddy production. Twenty-five farmers were selected randomly from each taluka, resulting in a total sample size of 50 farmers. For the study, 10 seed dealers were selected from Mandya district, keeping in mind, the relative importance of agencies in the total volume of business especially in paddy seeds marketing. The reference year for the study was 2013-14 and the collection of data was carried out during the months of March and April 2014.

Theil's entropy :

Theil's Entropy $E(X)$ is a measure of the distribution of the market share among the various seed companies / institutions producing as well as marketing paddy seeds in the market (Theil, 1967).

Thus,

$$E(x) = \sum_{i=1}^n P_i \ln (1/P_i)$$

$$\text{where, } P_i = X_i / \sum_{i=1}^n X_i ;$$

X_i is the quantity of paddy seeds of a particular company used by the sample farmer.

$\sum X_i$ is the total paddy seeds used by the sample farmers.

n is the number of companies involved in paddy seeds production and marketing.

The value of $E(X)$ ranges between 0 and $\ln(n)$. An index of 0 indicates that the market is concentrated and value of $\ln(n)$ indicates that all the paddy seed companies have equal share in the market. Hence, market concentration is inversely related to the indices $E(X)$. Thus, Theil suggested a modification as follows.

$$I(X) = \ln(n) - E(X)$$

It also ranges between $\ln(n)$ and 0, but $I(X)$ is

directly related to concentration. This index $I(X)$ can be bounded within the range of 0 and 1 by dividing the index as follows.

$$M(X) = I(X) \div \ln(n)$$

Since $M(X)$ is only an extension of $I(X)$, market concentration is directly proportional to $M(X)$ also.

Compound growth rate :

For estimating the compound growth rate of sales of paddy seeds by different agencies in Mandya district, an exponential form of the growth function was used as shown below.

$$Y_t = AB^t \quad \text{--- (1)}$$

where, Y_t = Sales in the year 't'

A = Intercept indicating Y in the base period (t = 0)

B = 1 + g, where g = growth rate

t_i = time period (i = 1 to 8)

By taking the logarithm, equation (1) was transformed into the following form.

$$\log Y_t = \log A + (\log B) \cdot t \quad \text{--- (2)}$$

where, $Q = \log Y_t$

a = $\log A$

b = $\log B$

Equation (2) was rewritten as:

$Q_t = a + b \cdot t$, which was estimated using Ordinary Least Squares (OLS) method.

The compound growth rate, g, was then calculated as follows.

$$G = (\text{Antilog } b - 1) \cdot 100$$

RESULTS AND DATA ANALYSIS :

The results obtained from the present investigation as well as relevant discussion have been summarized under following heads :

Concentration of market power in paddy seeds trade in Mandya district :

By market structure, we mean size and design of the market. It also includes the manner of operation of the market. In other words, market structure refers to organizational characteristics of a market which influence the nature of competition and pricing and affect the conduct of business firm. One of the important components of market structure is concentration of market power. This determines the nature of competition and consequently, the market conduct and performance. The seed agency / company-wise market share in paddy seeds trade in Mandya district for the period from 2006-

Table 1 : Seed agency / company-wise market share in paddy seeds trade in Mandya district

Sr. No.	Years	Sales of paddy seeds (in quintals)								Total
		KSSC	NSC	Private seed companies					Others	
				Venkateshwara Hybrid seeds	Ganga Kaveri seeds	Kaveri seeds	Krishi seeds	Sandeep seeds		
1.	2006-2007	23673 (79.46)	3225 (10.82)	950 (3.19)	780 (2.62)	420 (1.41)	385 (1.29)	290 (0.97)	70 (0.23)	29793 (100)
2.	2007-2008	22537 (80.05)	2850 (10.12)	835 (2.97)	910 (3.23)	388 (1.38)	352 (1.25)	225 (0.80)	55 (0.20)	28152 (100)
3.	2008-2009	24136 (72.00)	3578 (10.67)	1558 (4.65)	1160 (3.46)	999 (2.98)	1032 (3.08)	972 (2.90)	87 (0.26)	33522 (100)
4.	2009-2010	26945 (75.70)	3225 (9.06)	1208 (3.39)	1144 (3.21)	1003 (2.82)	1082 (3.04)	922 (2.59)	66 (0.19)	35595 (100)
5.	2010-2011	26609 (68.28)	7137 (18.31)	1091 (2.80)	1170 (3.00)	963 (2.47)	1042 (2.67)	882 (2.26)	77 (0.20)	38971 (100)
6.	2011-2012	28366 (82.90)	2753 (8.05)	952 (2.78)	674 (1.97)	522 (1.53)	409 (1.20)	492 (1.44)	48 (0.14)	34216 (100)
7.	2012-2013	18053 (78.82)	925 (4.04)	986 (4.31)	1156 (5.05)	543 (2.37)	591 (2.58)	566 (2.47)	83 (0.36)	22903 (100)
8.	2013-2014	28499 (94.55)	1044 (3.46)	127 (0.42)	101 (0.34)	162 (0.54)	112 (0.37)	75 (0.25)	23 (0.08)	30143 (100)
9.	Total	198818 (78.47)	24737 (9.76)	7707 (3.04)	7095 (2.80)	5000 (1.97)	5005 (1.98)	4424 (1.75)	509 (0.20)	253355 (100)

Note: Figures in parentheses indicate percentages to the row total.

Source: Department of Agriculture, Mandya.

07 to 2013-14 is presented in Table 1. The analysis revealed that the market was oligopolistic in nature as there were few agencies / companies dealing with paddy seeds. Among the various agencies / companies prevalent in the study area, Karnataka State Seeds Corporation Limited (KSSC) was the dominant player with an average market share of about 78 per cent for the reference period (2006-07 to 2013-14) followed by National Seeds Corporation (NSC) with around 10 per cent. This was due to the fact that the prices of KSSC and NSC paddy seeds were reasonable when compared to the private agencies on one hand and on the other, the farmers preferred seeds of Government agencies as they were confident about their quality and performance.

The structure of the paddy seeds market in Mandya district was analysed using Theil's Entropy Index (Table 2). The index worked out to be 0.09. If the value of the index is zero, it means that the market is highly concentrated and if it is one, the market shares are equally distributed. Since the value was 0.09, it can be inferred that the paddy seeds market in Mandya was highly

concentrated. The oligopolistic nature of the paddy seeds market with the dominance of KSSC as a major player contributed to a low index value of 0.09. Beakatti (2007) in his study on market structure of cotton seeds market in Dharwad, Haveri and Gadag districts found that the Gini co-efficient ratio was 0.950 for Bt cotton seed markets and 0.947 for non-Bt cotton seed markets, which indicated that the markets for cotton seeds were monopolistic in nature. Hosmani (2007) in his study on market structure of vegetable seeds markets in Belgaum district found that the Lorenz co-efficients of inequality for Belgaum, Khanapur and Saundatti taluks were 0.287, 0.309 and 0.286 respectively, indicating lower concentration of market power with vegetable seed dealers in the taluk.

Trend in sales of paddy seeds by different agencies / companies in Mandya district :

The trend in sales of paddy seeds by different agencies / companies for the period from 2006-07 to 2013-14 was analysed by computing compound growth rates

Table 2 : Theil's entropy index for paddy seeds market in Mandya district

Sr. No.	Seed agencies / companies	Quantity (kg)	Proportion (P_i)	$P_i * \ln (1/P_i)$
1.	KSSC	198818	0.784	0.082
2.	NSC	24797	0.097	0.097
3.	Venkateshwara Hybrid Seeds	7707	0.030	0.045
4.	Ganga Kaveri Seeds	7095	0.028	0.043
5.	Kaveri Seeds	5000	0.019	0.032
6.	Krishi Seeds	5005	0.019	0.032
7.	Sandeep Seeds	4424	0.017	0.029
8.	Others	509	0.002	0.005
	Total	253355	1.000	0.365

$$E(X) = 0.365$$

$$I(X) = 0.53$$

$$M(X) = I(X) / \ln(X) = 0.09$$

Table 3 : Trend in sales of paddy seeds by different agencies / companies in Mandya district

Sr. No.	Seed agencies / companies	CAGR (%)
1.	KSSC	+0.79
2.	NSC	-14.86
3.	Venkateshwara Hybrid Seeds	-16.19
4.	Ganga Kaveri Seeds	-16.07
5.	Kaveri Seeds	-7.97
6.	Krishi Seeds	-10.02
7.	Sandeep Seeds	-7.93
8.	Others	-8.39
	Total	-0.95

Note: CAGR – Compound average growth rate

CAGR pertains to the period 2006-2007 to 2013-14

Table 4 : Factors influencing brand loyalty of farmers in purchase of paddy seeds in Mandya district

Sr. No.	Factors	No. of farmers*	Per cent to the total
1.	Good quality	37	74
2.	Good yield	31	62
3.	Free from admixtures	15	30
4.	Certified seeds	13	26

Note: * multiple responses

and the same is presented in Table 3. All the agencies / companies except KSSC exhibited negative growth rates with regard to sale of paddy seeds for the reference period. KSSC was the only agency which registered a positive growth rate while all other agencies including NSC registered negative growth rates. Though, KSSC registered a positive growth rate, it was meagre (0.79 %). NSC registered a negative growth rate of 14.86 per cent for the reference period. The growth rate of private seed companies was negative with Venkateshwara Hybrid seeds exhibiting the highest negative growth rate of 16.19 per cent, followed by Ganga Kaveri seeds (-16.07 %), Krishi seeds (-10.02 %), Kaveri seeds (-7.97 %) and Sandeep seeds (-7.93 %). The overall growth rate of sales of paddy seeds by all the seed agencies (Government as well as private) operating in Mandya district was found to be negative (-0.95 %) for the reference period. This indicates that the demand for paddy seeds in Mandya district for the reference period was more or less constant implying that the paddy seeds market was saturated.

Factors influencing the brand loyalty of farmers in purchase of paddy seeds in Mandya district :

Table 4 presents the factors influencing the brand loyalty of farmers in purchase of paddy seeds. For majority (74 %) of the farmers, good quality of seeds was the most important factor which influenced their loyalty towards a particular brand. This is because seed is the most important input which determines the productivity of a particular crop. The next important factor which influenced brand loyalty was good yield as opined by 62 per cent of the farmers. This is due to the fact that the returns realized by the farmer depend on the yield. The other factors which influenced brand loyalty were free from admixtures (15 %); and certified seeds (13 %). This is quite obvious as farmers would prefer certified seeds which are free from admixtures.

Conclusion :

The paddy seeds market in Mandya district was oligopolistic in nature as there were few agencies / companies dealing with paddy seeds. KSSC was the dominant player with an average market share of about 78 per cent for the reference period (2006-07 to 2013-14) followed by NSC with around 10 per cent. This was due to the fact that the prices of KSSC and NSC paddy seeds were reasonable when compared to the private agencies on one hand and on the other, the farmers preferred seeds of Government agencies as they were confident about their quality and performance. The Theil's Entropy Index was found to be 0.09, indicating that the paddy seeds market was highly concentrated. All the agencies / companies except KSSC exhibited negative growth rates with regard to sale of paddy seeds. KSSC was the only agency which registered a positive growth rate while all other agencies including NSC registered negative growth rates. The overall growth rate of sales of paddy seeds by all the seed agencies (Government as well as private) operating in Mandya district was found to be negative (-0.95 %). This indicates that the demand for paddy seeds in Mandya district was more or less constant implying that the paddy seeds market was saturated. For majority (74 %) of the farmers, good quality of seeds was the most important factor which influenced their loyalty towards a particular brand. Hence, the seed agencies / companies may focus on supply of good quality seeds in the long run.

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